### Project: Class Recommendr

**Abstract:** For the last 4 years of our university career there have been many opportunities to select courses that we would like to take. These electives are often numerous, covering a large variety of topics with information spread everywhere meaning we could never find what the correct elective for us would be. As such we created Class Recommendr as a way to reduce the stress of finding an elective and help find the right courses for you. Class Recommendr is a web application that uses natural language processing and a word vectorization algorithm to determine similarities between courses. We then gather information from a user about which courses they have liked in the past (or have interest in) and provide them with the courses that share the most similarities. Users are able to change which courses they like in order to receive different recommendations or provide restrictions through filters in order to help narrow down the search. With Class Recommendr finding the right course for you won’t have to be a chore anymore.

**Team:** OlivUS  
William Fincher - wfincher@uwo.ca  
Jacob Prouse - jprouse2@uwo.ca  
Kyle Hendrikx - khendr6@uwo.ca

**Demo Link:** [https://youtu.be/wqr0lw5y_jc](https://youtu.be/wqr0lw5y_jc)

### Project: ChefPlanète

**Abstract:** Healthy eating has become a growing trend among students and young professionals as they strive to live a healthier lifestyle. However, many people fail to make time or plan accordingly for meal prepping and resort to ordering-in instead. ChefPlanète aims to provide a solution to this need by logging a user’s grocery trips and keeping track of their food inventory in order to recommend recipes. The recipes are recommended based on food items the user already owns, which encourages the user to cook a meal as the necessary items are already accessible. ChefPlanète will also consider the user’s dietary restrictions, allergies and personal goals. Food purchased on a grocery trip will be instantly uploaded to the user’s profile with the simple click of their phone’s camera. The goal of ChefPlanète is to make meal prepping more convenient, while saving time and limiting food waste.

**Team:** SKAI Solutions  
Steven Li - sli737@uwo.ca  
Kahlia Lepple - klepple@uwo.ca  
Ashini Tennakoon - atennako@uwo.ca  
Iris (Zijing) Zhou - zzhou273@uwo.ca

**Demo Link:** [https://www.youtube.com/watch?v=8panrxqpc3u&feature=youtu.be](https://www.youtube.com/watch?v=8panrxqpc3u&feature=youtu.be)

### Project: HomeShare

**Abstract:** Within the residential community, individuals have historically struggled with the organization and communication between themselves and their fellow tenants (roommates). Although not prevalent to the outside observer, nor to smaller groups of tenants (1-2 people), this issue is undeniably apparent to larger groups. Specifically, student housing presents itself as the most significant group, because tenants tend to share living spaces with as many roommates as possible in order to save on cost. HomeShare is a mobile application that is meant to help users (roommates) coordinate themselves and the people they live with, by acting as a platform, all-in-one solution that supports many different functions. There are six core features in place to accomplish this goal: 1) shared payments, 2) shared utility bills, 3) messaging / chat, 4) home occupancy checking, 5) errands scheduling, and 6) chore delegation. Additionally, there are many supporting
functionalities that must be in place as well – such as user accounts, login / signup, groups / groups of roommates, and more.

**Team:** HomeShare
Ramzi Abdulahi
- rabadulah@uwo.ca
- https://www.linkedin.com/in/ramzi-abdulahi/
- https://github.com/rabadulah

Matthew Chan
- mchan393@uwo.ca
- https://www.linkedin.com/in/matthewhtchan/
- https://github.com/matthewhtc

Spencer Dobson
- rdobson4@uwo.ca
- https://www.linkedin.com/in/spencer-dobson/
- https://github.com/dobsonspencer

**Demo Link:** https://www.youtube.com/watch?v=rtg7w5hxjyk&feature=youtu.be

**Project:** Nature Conservancy Carbon Valuation Tool
**Abstract:** The nature conservancy of Canada is a non-profit land conservation organization that works to conserve over 14 million hectares of land across the country. Conserved lands across Canada are able to capture a large amount of carbon, and those credits can be sold to corporations who seek to offset some of their carbon emissions. They have identified a significant opportunity to generate revenue from their lands through these sales, which would allow them to continue their efforts and acquire more land to be conserved. In order to take advantage of this opportunity, the nature conservancy of Canada has asked our group to develop a pricing model that would allow them to value their lands based on the amount of carbon it can capture, and develop an application to value and track their current lands and potential acquisitions throughout Canada. This application has the potential to unlock millions of dollars of value to the nature conservancy of Canada, which would greatly help them continue their good work.

**Team:** Catalyst Consulting
Josh Altmann: jaltmann@uwo.ca
Peter Aucoin: paucoin@uwo.ca
John Sparrow: isparro@uwo.ca
Logan Whitla: lwhitla@uwo.ca

**demo link:** https://youtu.be/qzsvhpiewde

**Project:** Homes Like This
**Abstract:** The most popular real estate search website in Canada, realtor.ca, reported that in 2018, they had over 42 million visitors on their website. With the internet, it has never been easier to search for properties to purchase, or to put up one’s own property for sale. However, there is a clear limitation with current real estate search websites – they only allow users to filter their search criteria by numeric or text-based inputs. For example, users can filter by a price range, or the size of the property in terms of square feet, or perhaps the number of bedrooms and washrooms. The problem with this method is that it does not align with the way in which people naturally think of properties that they would like to purchase. People imagine their dream homes visually. There is no way to go on a website like realtor.ca and tell it, “I want a house that looks like this.” In order to solve this, we developed homes like this - a website that allows users to upload images (from either their desktop computers or mobile devices) of their dream homes, and it will return listings of current homes
for sale that look the most visually similar to the user’s submitted image. Now, finding and purchasing the home of your dreams will be easier and more intuitive than ever.

Team: FOB Tech
Brian Lim: blim23@uwo.ca
Forrest Lin: flin48@uwo.ca
Oreoluwatomiwa Ademidun: oademid@uwo.ca

Demo Link: https://www.youtube.com/watch?v=sip19jjravk&feature=youtu.be

Project: BrainView
Abstract: Hydrocephalus is a condition in which an accumulation of cerebrospinal fluid (CSF) occurs within the ventricles of the brain; this increased pressure can cause harmful and lasting damage to a patient. Currently, doctors will drill a hole into a patient’s skull via surface-level anatomy landmarks in order to drain the fluid. Often this incision must be done multiple times since neurosurgeons have no way of knowing exactly where the incision needs to be made and success is not known until receipt of CSF is recorded. Current neuro-navigational tools are not scalable in economically developing nations because they are prohibitively expensive. BrainView is a seamless, closed system neuro-navigational tool that is comprised of a web application and an augmented reality mobile application; the web application handles the processing of a patient’s ventricle model and the mobile application handles the projection of that model onto the patient's skull and allows the doctor to rotate, resize, and translate the projection.

Team: Brigade
Omar Chahbar - https://www.linkedin.com/in/ochahbar
Yousef Ouda - https://www.linkedin.com/in/yousef-ouda/
Jeffrey Kim - https://www.linkedin.com/in/skim96/
Elliott Choi - https://www.linkedin.com/in/elliottchoi/
Mustafa Dawoud - https://www.linkedin.com/in/mustafadawoud1/

Demo Link: https://www.youtube.com/watch?v=i1txot6ajbm&feature=youtu.be

Project: AR Surgery Simulation Plan & Train
Abstract: Surgical planning requires precision and care. In usual daily conversation, using indexicals such as ‘this’, ‘that’ allows individuals to present complex or specific objects through simply referencing. However, indexicals lose all meaning when the individuals engaged in the conversation are not able to relate to a common reference frame. Thus, traditional telecommunication methods such as voice calls, text messaging, and to a degree, even video messaging, are not able to fully utilize the capabilities of these indexicals. Preparations to surgeries or familiarization with complex physical objects require intense spacial perception, particularly to the referenced object. as our world becomes more globalized, technology is able to bring medical professionals from different regions and different continents together. However, these professionals are still bound by the limitation presented by traditional telecommunication methods. Determined to resolve this problem, team TI has decided to develop a platform that acts as an online AR surgical planning chatroom. In this chat room, organs and medical models for which the operation is prepared can be displayed and interacted with by the chatroom participants. By taking advantage of the nature of augmented reality via device cameras, the system bridges the context gap by introducing the model in the same orientation, size, and relative position to all parties connected to the instance. the system allows the user to upload models of the organs. The models come from various sources, usually instantiated from CT scans, MRIS.
### Team: TI (The International)
Wenlei Cai - wcai49@uwo.ca  
Honglue Guan - hguan25@uwo.ca  
Chengwei He - che57@uwo.ca  
Albert Li - ali429@uwo.ca

**Demo Link:** [https://www.youtube.com/watch?v=zkmlcgpzyd4](https://www.youtube.com/watch?v=zkmlcgpzyd4)

**Project: Pedestrian Detection for Intelligent Vehicles at Traffic Intersections**

**Abstract:** As we approach the advent of intelligent vehicles, the safety of humans must remain the top priority. Hundreds of pedestrians die each year from traffic collisions in Canada alone, and an intelligent vehicle may not have time to react to a pedestrian in the road by using its internal sensors alone. By using street-mounted cameras aimed at intersections or crosswalks, this project aims to give intelligent cars another sense that is not blocked by street-level obstacles. Using a video feed as input, the software will analyze the crosswalk using computer vision & machine learning technologies to determine if pedestrians are crossing or attempting to cross, and alert nearby vehicles before they can view the intersection.

**Team:** Bomb-Digdigies
Colton Nicotera

**Demo Link:** [https://www.youtube.com/watch?v=ppy7e6y2uhc](https://www.youtube.com/watch?v=ppy7e6y2uhc)

### Team: De Studios
Yunpeng Chai - ychai22@uwo.ca  
Hai yi Wang - hwang763@uwo.ca  
Jianping Ye - jye64@uwo.ca  
Zhenyu Zhang - zzhan729@uwo.ca

**Demo Link:** [https://youtu.be/fyppehv8wdg](https://youtu.be/fyppehv8wdg)

**Project: NurseVR**

**Abstract:** Hands on training is a vital part of education for any medical field; this is especially true for nursing students. Currently, universities have dedicated training spaces for these students however, medical equipment and training space are issues that all of these programs face. For example, western has a space that has 16 beds that allows 2 to 3 students per bed per training session. This means only a maximum of 48 students can train at a time. NurseVR, aims to help mitigate these issues by transferring the training scenario to a VR environment. There are currently simulators on the market that train technical(hands-on) nursing skills, however, NurseVR hopes to differentiate such training through the addition of non-technical (assessment) nursing training. The environment is currently designed to mimic a real life simulation space that is equipped with tools, iv, bed, monitor, etc. In addition to these, there are timers and voice recording tools within the scene so users are able to record their assessments of the patient’s situation. Currently, NurseVR hopes to provide a basis for Dr. Eagleson’s research in determining if VR is a good tool to train nurses in both technical and non-technical skill sets. the simulation only allows for the user to interact with the patient, it does not include patient feedback and animations. We hope to provide the basis and foundation for future development of the simulation so Dr. Eagleson and his team will be able to collect accurate and unbiased data for their study.

**Team:** De Studios

### Project: KuaiOrder

**Abstract:** Over the last few decades mobile devices have become an integral part our lives. This phenomenon has provided opportunities for industries to make services more convenient than ever before. Food is an essential part of human life, and various restaurants and services allow people to enjoy whatever food they crave. We identified restaurant ordering as a domain that could benefit from the use of mobile devices, and
created a mobile application to address this need. KuaiOrder is a service created to enrich the traditional restaurant experience, aiming to remove the need for physical menus and speed up the process of ordering at restaurants. KuaiOrder allows users to order food from a venue without the need for help from wait staff. The application uses QR code scanning to allow for quick and convenient access to a restaurant’s menu and ordering system, and allows restaurants to efficiently deal with orders coming through from said app as well. With KuaiOrder, users can easily find and submit their orders at their own pace and convenience, and businesses can take advantage of the reduced need for physical wait staff working on the floor.

**Team:** Team DKSS
Dong Wook Hong, Shiming Zang

**Demo Link:** [https://www.youtube.com/watch?v=w26zicvslyu&feature=youtu.be](https://www.youtube.com/watch?v=w26zicvslyu&feature=youtu.be)

**Project: Zooify**
With animals from across the world, zoos cater to our naturally curious minds: providing great opportunities to learn more about the natural world around us. However, due to the increased use of technology in education, learning has shifted from traditional methods to more interactive experiences. As a consequence, signage at zoos have grown obsolete and disinteresting. Zooify aims to enhance the educational experience that goes with a visit to the zoo by making the experience more interactive. With Zooify, users can tailor their own visits by taking photos of interesting animals, identifying the animal and receiving information on them. Visitors are encouraged to visit a variety of exhibits, as the number of animals they’ve “discovered” grows. By providing an alternative to the traditional experience currently provided by zoos, Zooify intends to increase the depth of interaction for each exhibit, maintaining the user’s attention and encouraging learning.

**Team:** Blobfish Solutions
Matthew Price
- email: mprice33@uwo.ca

Jimmy Domagala-Tang
- personal site: [https://jimmydt.ca/](https://jimmydt.ca/)
- linkedin: [https://www.linkedin.com/in/jimmy-domagala-tang/](https://www.linkedin.com/in/jimmy-domagala-tang/)
- github: [https://github.com/jdomaga](https://github.com/jdomaga)
- email: jimmydomagalatang@gmail.com

Fayadh Ahmed
- email: fayadh56@gmail.com
- github: github.com/fayadh56
- linkedin: [https://www.linkedin.com/in/fayadh56/](https://www.linkedin.com/in/fayadh56/)

Trent Chappus
- email: tchappus@uwo.ca
- linkedin: [https://www.linkedin.com/in/tchappus/](https://www.linkedin.com/in/tchappus/)
- github: [https://github.com/tchappus](https://github.com/tchappus)

**Demo Link:** [https://youtu.be/4zt7ayyktcc](https://youtu.be/4zt7ayyktcc)

**Project: Liftr**
**Abstract:** Today there are many ways of developing your own personal fitness including YouTube videos, wearable fitness tech, websites like bodybuilding.com, and personal fitness trainers. Each existing solution either does not give you feedback on how you perform your workouts, or is far to expensive for the average person looking to pursue fitness. Liftr is a virtual personal fitness trainer that uses computer vision and artificial intelligence to provide users with real-time feedback on workout form and fitness tracking. Liftr is composed of
a workout machine that is installed in fitness centers and a companion app installed on user's phones. While performing workouts in front of the machine live form critiques and repetition counts are sent to the user's device.

**Team: Liftr**

Jason Chin (in video)
- [https://github.com/jrobchin](https://github.com/jrobchin)
- [https://www.linkedin.com/in/jrobchin/](https://www.linkedin.com/in/jrobchin/)

Harsh Patel
- [https://www.linkedin.com/in/harsh-patel1/](https://www.linkedin.com/in/harsh-patel1/)

**Demo Link:** [https://youtu.be/tzcrycjtwwa](https://youtu.be/tzcrycjtwwa)

**Project: GivnGo**

**Abstract:** GivnGo is a ride sharing mobile application which allows users to share their own bicycles on the platform for other users to rent or borrow. Our vision is to allow our users to quickly find bicycles that are accessible to enable them to easily get around their city. We can also provide a bit of extra income for users if they decide to become a bicycle lender on GivnGo. Perhaps due to the continuous increase of traffic in major cities and growing environmental awareness overall, people are looking for alternative ways to commute and are turning to ride sharing. For instance, the shift can be seen in Toronto’s bike sharing program that started in 2016 and has already seen great success, servicing upwards of 1,975,384 rides. All over the world bike sharing has taken off tremendously and with the launch of our application, anyone can help others with their growing transportation needs and profit from lending their bikes also. GivnGo is a cross-platform (iOS/android) mobile application written in dart using flutter. The applications main functionalities include GPS tracking services/map interface, in-app payment infrastructure, user stats tailored to borrowers and lenders, the facilitating of ordering the customized GivnGo lock mechanism, and much more.

**Team: 1er**

Ashley Ottogalli
- [https://www.linkedin.com/in/aabiro/](https://www.linkedin.com/in/aabiro/)
- [https://github.com/aottogal](https://github.com/aottogal)
- [aottogal@uwo.ca](mailto:aottogal@uwo.ca)

Aaryn Biro
- [https://www.linkedin.com/in/aabiro/](https://www.linkedin.com/in/aabiro/)
- [https://github.com/aabiro](https://github.com/aabiro)
- [abiro6@uwo.ca](mailto:abiro6@uwo.ca)

**Demo Link:** [https://youtu.be/ifas6g96hhm](https://youtu.be/ifas6g96hhm)

**Project: Message Box**

**Abstract:** In today’s society of phones, wearable technology and social media, new barriers to meeting people around you have formed. Lately, people are less inclined to interact with others around themselves and are found struggling to build stronger networks and meeting people. Social media has subconsciously reduced people’s ability to interact with others in close physical proximity, and siloed collaboration for them. MessageBox is a chat platform that solves today’s hardships of meeting people around you with a chat service that is entirely based on your location and the people around you. This service let’s people create chats based on topics/events of people’s interests and allow for collaboration of levels not previously possible. It also allows for you to see other users and events on a map and in an event feed so that people can be directed towards activities with like-minded individuals. There is a moderator to ensure the safety of all users, and all chats between any users is encrypted. It will let anyone in the same places, events, meetings, classrooms, streets and offices to collaborate like never before with as much privacy as they desire.
**Team:** Team Spicy  
Dhruv Tayl  
- email: dhruvtayl@gmail.com  
- github: https://github.com/dhruvtayl  
- linkedin: https://www.linkedin.com/in/dhruvtayl/  

Jevon Charran  
- email: jcharran@uwo.ca  
- github: https://github.com/jcharran  
- linkedin: https://www.linkedin.com/in/jevon-charran-58921597/  

Albert Schwartz  
- email: aschwa28@uwo.ca  
- github: https://github.com/albertschwartz  
- linkedin: https://www.linkedin.com/in/albertschwartz/  

Arpit Bhanot  
- email: abhanot@uwo.ca  
- github: https://github.com/abhanot  
- linkedin: https://www.linkedin.com/in/arpitbhanot/  

**Demo Link:** https://youtu.be/r_lb1atftuq

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**Project:** CubeSat Flight Software  

**Abstract:** The Canadian CubeSat project is an initiative funded by the Canadian space agency for students and professors of post-secondary institutions to design, develop, and launch their very own miniature satellites in a real space mission. In collaboration with Nunavut arctic college, western university was selected to build a 2u CubeSat for launch in 2021, managed by the western institute for earth & space exploration. As for all satellites, an effective yet robust flight software is critical in order for the mission to succeed. Western university’s CubeSat has its own specific requirements, namely supporting an interface with two 180 degree VR cameras, rotation, telemetry sensors, scheduling system, data transmission, and the ability to be controlled from a ground station while in orbit. These requirements must be met with software that can perform these tasks simultaneously and with fault tolerance. Our flight software aims to satisfy these requirements with a real-time operating system, developed using an stm32mcu, and afterwards ported to the CubeSat’s onboard computer.

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**Team:** Western3 Sat

Stephen Amey - samey3@uwo.ca  
Anthony Texeira - ateixeir4@uwo.ca  
Hyunjoon Kim - hkim778@uwo.ca  
Rakul Janatharan - rjanatha@uwo.ca

**Demo Link:** https://www.youtube.com/watch?v=_mohi9e1br4